# TEACHERS' ASSESSMENTS OF ELEMENTS OF MULTIMEDIA AND CONSTRUCTIVIST DIDACTICS IN SCHOOL

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Abstract

Despite the understandings that constructivist and multimedia didactics, as well as curricular theory and multiple intelligences theory, have been providing for years, what happens in the classroom and in the teaching process is still mostly teacher-centred. The didactic and methodological scenarios that prevail in our classes are more suitable to times long ago than to students belonging to the net-generation. The aim of this study is to examine the assessments of changes that happen in school and in classes (or those that could happen) under the influence of new didactic understandings and digital education technology. A specifically constructed questionnaire was used on a sample of primary education teachers (*N*=213), which is representative of Central Croatia, since the data were collected through individual surveys in schools located in the City of Zagreb and in eight counties. The data were collected by fourth-year students of teacher education studies from Zagreb, Petrinja, and Čakovec at the beginning of 2015. The questionnaire contained 25 statements that the respondents had to assess on a Likert-type scale. The results show that teachers consider that curricular changes are needed and that classes still lack a pedagogy of success for all. However, less criticism is directed towards the present (inadequate) teaching environment.

***Keywords***: constructivist didactics, multimedia didactics, primary education classes, primary education teachers

## Introduction[10]

Printed books evolved into the form they have today about five hundred and fifty years ago. It took approximately one hundred and fifty years for that great invention to be used for making books for learning (Comenius: *Orbis sensualium pictus*, 1654). Comenius finished his seminal work, *Didactica Magna*, in the Czech language in 1632, although the work was translated into Latin only quarter of a century later (1657). As of that year, the theory of the class-subject-lesson system became available to everyone who could read and understand Latin. At the time, Latin was the language of science, so *Didactica Magna* (*The Great Didactic*) was soon translated into the languages of other peoples and cultures. Consequently, the class-subject-lesson system as we know it today has been playing a role on the pedagogical stage for over three hundred and fifty years. At the time when *Didactica Magna* was written, books were scarce and the only media available for learning was the teacher, nature and the man-made products surrounding the teacher and the pupils. As the number of those who wanted or should have wanted to learn how to read, write and count grew constantly, the space where teaching and learning was organised transformed into a place that could satisfy the needs and expectations of everyone involved, which was frequently over fifty people in one room. The classroom would hold wooden benches to accommodate all the pupils (often over fifty!) who would sit, listen and watch whatever the teacher was doing. Listening, watching and copying were the main activities of pupils in overcrowded classrooms over the next several decades and centuries. Writing tables and benches where pupils would sit and perform their tasks were positioned like those in churches where a large number of people would come to listen to sermons. For years—for over two centuries—nothing changed in terms of the appearance of the classroom and its layout.

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Theoretical foundations

The first extensive criticism of the classroom as described above in which teachers talk and show (lecture, lecture-style instruction, frontal instruction) arose in the second half of the 19th century. The lists of those who offered didactic scenarios considerably different from those prevailing in the 18th and 19th century schools include Tolstoy, Dewey, Montessori, Kerschensteiner, Steiner, Freinet, and Petersen (Oelkers, 2010; Skiera, 2009). The said pedagogues observed that listening and watching do not result in the acquisition of skills important for further education and lifelong learning, i.e., for assuming work tasks in various service and production activities.

At the end of the 19th and the beginning of the 20th century, classrooms were transformed into factory-style workshops and laboratories; sitting/listening was replaced by research, on-hands learning and the participation of pupils in various projects requiring cooperation, communication, and problem solving, frequently outside the classroom and the school building. The enthusiasm of creative pedagogues and teachers lasted until World War 2, after which schools succumbed once again to didactic scenarios where pupils mostly sit, listen and watch their teachers. Project- and research-based instruction and active-work instruction lived on only in alternative schools where teachers followed the ideas of Dewey, Maria Montessori, Rudolf Steineror other representatives of the projects and directions of reform pedagogy. States that ideologically sided with the so-called Eastern Bloc did not have alternative schools. That was also the fate of the school system of the former Yugoslavia where even forty-five years after the end of World War 2 there were no schools other than those following uniform (official) 'state pedagogy', largely based on the literature of Soviet pedagogues.

Over the past three decades (at the end of the 20th and the beginning of the 21st century), schools and teachers have been buying and using various types of digital media (and hypermedia): the internet, smart boards, PowerPoint presentations, laptops, tablet computers, mobile phones and smart phones, and other multimedia interactive software received and used on such gadgets for learning. The said powerful and attractive media are often used within obsolete didactic frameworks (along with the didactic paradigm) that have been criticised for a long time. Powerful and flexible interactive media are mostly used for frontal instruction using the class-subject-lesson model that was introduced by Comenius three hundred and fifty years ago! PowerPoint presentations and smart boards thus only add a more contemporary digital dimension to frontal instruction during which pupils continue to sit, listen and watch.

There are many teachers and other experts in education who do not find anything disputable in such use of digital media; those who are provided with feedback on the lack of logic in such instruction usually do not want to change their opinion, or anything else in their work. This mindset exists in all states that emerged from the dissolution of former Yugoslavia, but also in the states of South East Europe.

The contemporary train of thought concerning learning, teaching, instruction, schools, and education in the digital age focuses on the need to change the role of the pupil and the teacher; other goals, content, situations and strategies of learning and assessment are emphasised. The significance and possibility of informal learning as opposed to formal education and school-based learning is particularly emphasised (Beetham & Sharpe, 2007; Selwyn, 2011; Sharpe, Beetham & De Freitas, 2010).

It is interesting that despite the plentiful results of empirical research concerning constructivist instruction and the use of new media in such instruction, the practice of teacher-centred teaching is slow to change. The meta-analysis by Rosen and Salomon (2007) shows that the use of digital media in constructivist instruction is of better quality than teacher-centred instruction and that it changes the duration of instruction considerably. However, it also shows that other forms of assessment of pupils' achievements are required in constructivist instruction, other than the tests and numerical grading used so far.

Teachers who are more prone to organising their classes by using new media are also more likely to organise their classes as constructivist ones (Hermanset al.,2008). Overby et al. (2010) had the same results in their research; they additionally comment that teachers who are more likely to believe that the use of digital media encourages pupil-centred instruction and, if there is a development plan to implement digital media, funding and planning of classes via media (at school level), then there is also a greater possibility of using media in instruction.

Friedrich and Hron (2011),based on an analysis of the results of research of teachers in Germany, hold that a number of factors are relevant for the successful implementation of new media in instruction. Thus, they

claim that the type of school (*Real schule* and *Gymnasium*), the school's development plan for implementing digital media, the more frequent use of such media in school and the propensity of the teacher towards constructivist ideas are to be regarded as significant predictors of the organisation of pupil-centred ICT-supported classes (constructivist instruction). Petko (2012) obtained similar results in his research of teachers in Switzerland; he examined the theoretical postulates of the Will-Skill-Tool model, namely that in order to have successful pupil-centred classes supported with new media, the willingness to organise such classes is significant, as is the ability of the teacher to organise such instruction and to use ICT, and also the fact that it is available, i.e., that digital equipment exists in the school. His results show that in order to successfully implement new media in classes, the teacher's personal propensity and competence to use them is significant, and so is the school equipment, and that all such factors are significant for pupil-centred instruction (constructivist instruction).

Further, empirical research confirms that the new media offer a better opportunity for making instruction more individual, especially as part of the 'pedagogy of success for all' paradigm. The use of new media enables optimal learning for pupils with various learning styles and social and emotional characteristics (Hsu, 2011; Martinez, 2001). Further, pupils who attend individualised classes express greater satisfaction with these classes (Chen, Lai & Weng, 2009), but a high level of self-efficiency for individualised instruction via ICT is also important (Hsu, 2011). Sazet al. (2011) claim that individualised instruction with new media is connected with more frequent constructivist instruction, while Jones and McLean (2012) claim that individualised classes with digital media depend on the authenticity of the learning situation, pupils' interests and the very nature of the assessment achieved.

Savaşci Açikalin (2014) published the results of his research where he examined the readiness of science teachers to use digital teaching technology in specialised classrooms (cabinets). The research included 63 teachers who had just finished a teacher licence training programme at one of the largest universities in Turkey. They were asked to propose a methodological scenario for any topic from the curriculum they teach on the assumption that they had an ideal teaching environment and equipment. Based on an analysis of all the methodological scenarios offered, the participants were asked to give their reasons for using the media and the design of their media environment. The results showed that PowerPoint was the most frequently used teaching medium in all the proposed scenarios. Immediately following PowerPoint came textbooks and the classic blackboard. None of the participants envisaged a more prominent position for the internet, interactive smart boards, tablet computers, computer simulations or any other educational programme, although they were instructed to imagine an ideal educational environment in terms of time and resources.

Similar results would probably be obtained with young teachers in Croatia; indeed, the results published by Savaşci Açikalin (2014) are similar to scenarios that we witness in Croatian schools on a daily basis.

Despite many new ideas appearing before teachers from recent papers in the field of learning psychology (Bransford, Brown & Cocking (2000), neuroscience (Herrmann, 2009), curriculum theory (Moore, 2015; Möller, 1994) and multimedia didactics (Arnold & Lermen, 2006; Kerres, 2013; Roche, 2012; Tulodziecki & Herzig, 2002), classrooms are still dominated by didactic scenarios similar to those that existed one hundred and fifty years ago, or even longer ago: the teacher teaches and the pupils listen and watch. Constructivist theory (Reich, 2006; Terhart, 2003), curriculum theories (Reece & Walker, 2011) and the theory of multiple intelligences (Gardner, 2011) have resulted only in slow change in classes and school. Teachers are active, and pupils (mostly) passive. The educational environment is adjusted to frontal instruction where the teacher is more active than the pupil. Communications media used by teachers to make their lessons more attractive and interesting are the only things that have changed.

On the other hand, media and constructivist didactic theories point to the opposite. They show that the use of new media in classes enables individualisation, learning through research, collaborative learning, authentic learning and creative learning (Kanselaar et al., 2002; Schulz-Zander & Tulodziecki, 2009). The said didactic elements are formed and recognised in the orientation and movements of reform pedagogy, so it can be pointed out that the use of new media re-affirms and provides new meaning to the elements of reform pedagogy (Kommer, 2001).

There is an abundance of literature on the need to ensure conditions in schools where each pupil can achieve the expected results in learning and can experience an optimal self-actualisation of his/her abilities through the organisation of events where pupils are more active than teachers (Baert et al., 2002;Eichelberger et al., 2008; Reece & Walker, 2006). However, in Croatian schools such changes occur slowly.

Based on a theoretical-comparative and historical analysis and the results of empirical research, it is evident that changes in the organisation of classes are insufficient and slow, especially in terms of developing the use of new media and constructivist learning in Croatian primary schools. For this reason, empirical research was conducted with the aim of gaining a better insight into the assessments and opinions of teachers concerning the existing situation and the changes that are needed in the classroom.

Empirical research (Croatia)

*Aims*

The aim of the research was to examine how primary school teachers assessed didactic changes in the classroom. Further, the authors wanted to examine whether there are differences in the assessment of changes in classes related to gender, years of service and the frequency of professional development of teachers working in the first to the fourth grades.

*Sample*

The research included 213 first to fourth grade teachers from eight counties and the City of Zagreb. The sample consisted of 206 (96.7%) women and 7 (3.3%) men. In terms of the years of service, 41 (19.2%) had up to ten years of service, 53 (24.9%) had from eleven to twenty years of service, 92 (43.2%) had from twenty-one to thirty years, and 27 (12.7%) had over thirty years of service. In terms of the frequency of professional development, two (0.9%) had not attended professional development events, 16 (7.5%) attended them once, 37 (17.4%) attended them twice, and 158 (74.2%) three or more times.

*Instruments*

Data were collected via a questionnaire consisting of two parts. The first part related to the demographic characteristics of interviewees, while the second included an instrument for examining opinions about classes and new media, and constructivist instruction. The demographic data covered gender, years of service and the frequency of professional development in the course of the year.

For the collection of data concerning assessment of the situation in classes, a special instrument was constructed consisting of 25 manifest items on a Likert-type four-degree scale (ranging from 1=completely disagree to 4=completely agree). Following the construction of the questionnaire, the authors carried out an exploratory factor analysis with a view to verifying validity with saturation greater than 0.45 and varimax rotation. Data were appropriate for factor analysis (*KMO* = 0.707; Bartlett's Test of Sphericityis significant $p < .000$). Eight initial factors appeared with an eigen value greater than 1, which together account for 58.23% of the total variance, and three factors were retained as they include saturation with three and more manifest items (Table 1). The first factor was named *'Curricular Changes Required'* and includes seven manifest items, the second was named '*Pedagogy of Success for All*' and includes four items, while the third one was named '*A Critique of the Educational Environment*', which includes three manifest items (Table 2). The Cronbach Alpha test showed that the factor *'Curricular Changes Required'* is reliable, while the factors '*A Critique of the Educational Environment*' and '*Pedagogy of Success for All*' have somewhat lower reliability. The connections between factors are the following: *'Curricular Changes Required'* and' *Pedagogy of Success for All*' ($r = .296$; $p < .01$), *'Curricular Changes Required'* and '*A Critique of the Educational Environment*' ($r = .143$; $p < .05$), and '*Pedagogy of Success for All*' and '*A Critique of the Educational Environment*' ($r = .44$; $p > .05$).

Table 1. Instrument Factor Structure

| | Items | Factors | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 46. | Pupils should learn more about modern digital media (tablets, smart phones, iPads) in school. | .75 | | | | | | | |
| 19. | Pupils in school should learn with the help of smart phones. | .69 | | | | | | | |
| 42. | I will readily enrich my communication with pupils with electronic mail and text messages. | .65 | | | | | | | |
| 48. | Methods and content that are under the influence of new media (social networks, smart phones, iPadsand the like) should be changed substantially in school. | .65 | | | | | | | |
| 33. | Published textbooks should be replaced by multimedia sources in the form of iPads or tablet computers with a large amount of audio-visual and multimedia content accompanying the text. | .60 | | | | | | | |
| 37. | I readily use social networks (Facebook, Twitter, Instagram...) in my communication with pupils. | .52 | | | | -.50 | | | |
| 27. | Pupils should learn in class about the culture of communication on social networks (Facebook, Twitter...). | .49 | | | | | | | |
| 28. | The seating layout in classrooms that resembles cinemas is not appropriate for achieving the goals of education in school today. | .47 | | | | | | | |
| 29. | Schools are lacking modern didactic-methodical aids. | | .77 | | | | | | |
| 30. | Schools give pupils too few tasks for which they need to use the internet or other digital media. | | .75 | | | | | | |
| 34. | Through suitable pedagogical and didactical procedures, each pupil should be given the opportunity to be academically successful. | | .51 | | | | | | |
| 25. | Regardless of the attractiveness of new digital media in school, opportunities for more direct interaction between pupils should be provided. | | .45 | | | | | | |
| 38. | PowerPoint presentations are a huge didactical disaster that resembles the formerly used practice of dictation in classes. | | | -.79 | | | | | |
| 32. | PowerPoint presentations are of great help to teachers in presenting the content of learning. | | | .70 | | | | | |
| 35. | The classroom in which pupils mostly sit at desks laid out in a circle or U-shaped formation are not suitable for achieving the goals of today's school. | | | -.46 | | | | | |
| 3. | In school, a large amount of time is devoted to learning via research, investigation and problem solving. | | | | -.79 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2. | During classes, pupils spend too much time only sitting, listening and watching what the teacher is doing. | | | .69 | | | | |
| 5. | Experts who claim that classes should be more about learning and less about teaching are correct. | | | | .75 | | | |
| 50. | Games and simulations are valuable teaching methods for achieving the goals of learning in today's school. | | | | .50 | | | |
| 17. | In a few years, methodical scenarios in classes will differ significantly from what we organise in school today. | | | | | .76 | | |
| 24. | Today's generations of pupils need methodical scenarios in classes which are different from those that dominated ten or twenty years ago. | | | | | .65 | | |
| 23. | PowerPoint is used too much as a medium for presenting textual content that pupils have to read, copy and learn for a pass grade. | | | | | | .76 | |
| 6. | Collaborative learning in the form of group work and project classes is much more valuable than frontal instruction. | | | | | | .51 | |
| 4. | Fulfilling the curriculum means a well-developed lecture by the teacher. | | | | | | | .79 |
| 40. | In tests, pupils are mostly asked to know facts and definitions, and there are too few tasks in which they are asked to use critical thinking and to make conclusions. | | | .45 | | | | -.54 |
| Eigen value | | 4.1 | 2.6 | 1.7 | 1.5 | 1.3 | 1.3 | 1.1 | 1.0 |
| Explained variance | | 13.27 | 8.71 | 6.98 | 6.94 | 5.83 | 5.77 | 5.61 | 5.08 |
| α | | .77 | .66 | .48 | | | | | |

*Procedure*

Data were collected by fourth-year teacher education students from Zagreb, Petrinja and Čakovec in early 2015 as part of their practical work in schools. Before going to the schools, students were instructed on how to collect data. Research was completely anonymous and voluntary. Teachers filled out questionnaires using the paper-pen method.

Results of empirical research

Table 2.Descriptive characteristics of manifest statements

| Statement | *M* | *Mdn* | *SD* | *Min* | *Max* |
|---|---|---|---|---|---|
| Factor *Curricular Changes Required* | | | | | |
| Pupils should learn more about modern digital media (tablets, smart phones, iPads) in school. | 2.77 | 3 | .79 | 1 | 4 |
| Pupils in school should learn with the help of smart phones. | 1.95 | 2 | .89 | 1 | 4 |
| I will readily enrich my communication with pupils with | 2.68 | 3 | 1.04 | 1 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| electronic mail and text messages. | | | | | |
| Methods and content that are under the influence of new media (social networks, smart phones, iPads and the like) should be changed substantially in school. | 2.80 | 3 | .78 | 1 | 4 |
| Published textbooks should be replaced by multimedia sources in the form of iPads or tablet computers with a great amount of audio-visual and multimedia content accompanying the text. | 2.49 | 3 | .83 | 1 | 4 |
| Pupils should learn in class about the culture of communication on social networks (Facebook, Twitter...). | 3.20 | 3 | .88 | 1 | 4 |
| The seating layout in classrooms that resembles cinemas is not appropriate for achieving the goals of education in school today. | 3.13 | 3 | .81 | 1 | 4 |
| Factor *Pedagogy of Success for All* | | | | | |
| Schools are lacking modern didactical-methodical aids. | 3.52 | 4 | .73 | 1 | 4 |
| Schools give pupils too few tasks for which they need to use the internet or other digital media. | 3.51 | 4 | .66 | 1 | 4 |
| Through adequate pedagogical and didactical procedures, each pupil should be given the opportunity to be academically successful. | 3.71 | 4 | .58 | 1 | 4 |
| Regardless of the attractiveness of new digital media in school, opportunities for more direct interaction between pupils should be provided. | 3.65 | 4 | .57 | 1 | 4 |
| Factor *A Critique of the Educational Environment* | | | | | |
| PowerPoint presentations are a huge didactical disaster that resembles the formerly used practice of dictation in classes. | 1.90 | 2 | .82 | 1 | 4 |
| PowerPoint presentations are of great help to teachers in presenting the content of learning. | 3.31 | 3 | .73 | 1 | 4 |
| The classroom in which pupils mostly sit at desks laid out in a circle or U-shaped formation are not suitable for achieving the goals of today's school. | 2.15 | 2 | .83 | 1 | 4 |

Based on the results of the descriptive characteristics of the manifest statements (Table 2), it is evident that teachers agree with the following statements in particular: *"Regardless of the attractiveness of new digital media in school, opportunities for more direct interaction between pupils should be provided," "Schools are lacking modern didactical-methodical aids," "Schools give pupils too few tasks for which they need to use the internet or other digital media,"* and *"Through adequate pedagogical and didactical procedures, each pupil should be given the opportunity to be academically successful."*

The results show that teachers regard the new media as significant, but also that the relationship between pupils and teachers is still crucial. Further, they point out that there is a low pedagogical standard in schools, i.e., schools are not well-equipped with digital devices—although at the moment the use of new media in

classes is strongly advocated—which can be interpreted in such a way that the Ministry of Science, Education and Sports formally advocates the use of new media in classes, but in practice implements such decisions to a much lesser extent. Further, teachers state that in classes methodical and didactic scenarios in which pupils study by using the new media are lacking, and that individualisation as the manifest form of 'pedagogy of success for all' is absent. On the other hand, it is possible to interpret the foregoing in a way that teachers are still not likely to implement the recent technological innovations in class, and that they are particularly sceptical towards mobile phones, i.e., smart phones in class; they rather disagree with their use, which is evident from their disagreement with the following statement, *"Pupils in school should learn with the help of smart phones."* The fact that teachers quite disagree with the statement that "*PowerPoint presentations are a huge didactical disaster that resembles the formerly used practice of dictation in classes*" is particularly significant; it confirms that teachers implement the new media in teacher-centred classes, and not by means of teaching scenarios and strategies that are pupil-centred and learning-oriented.

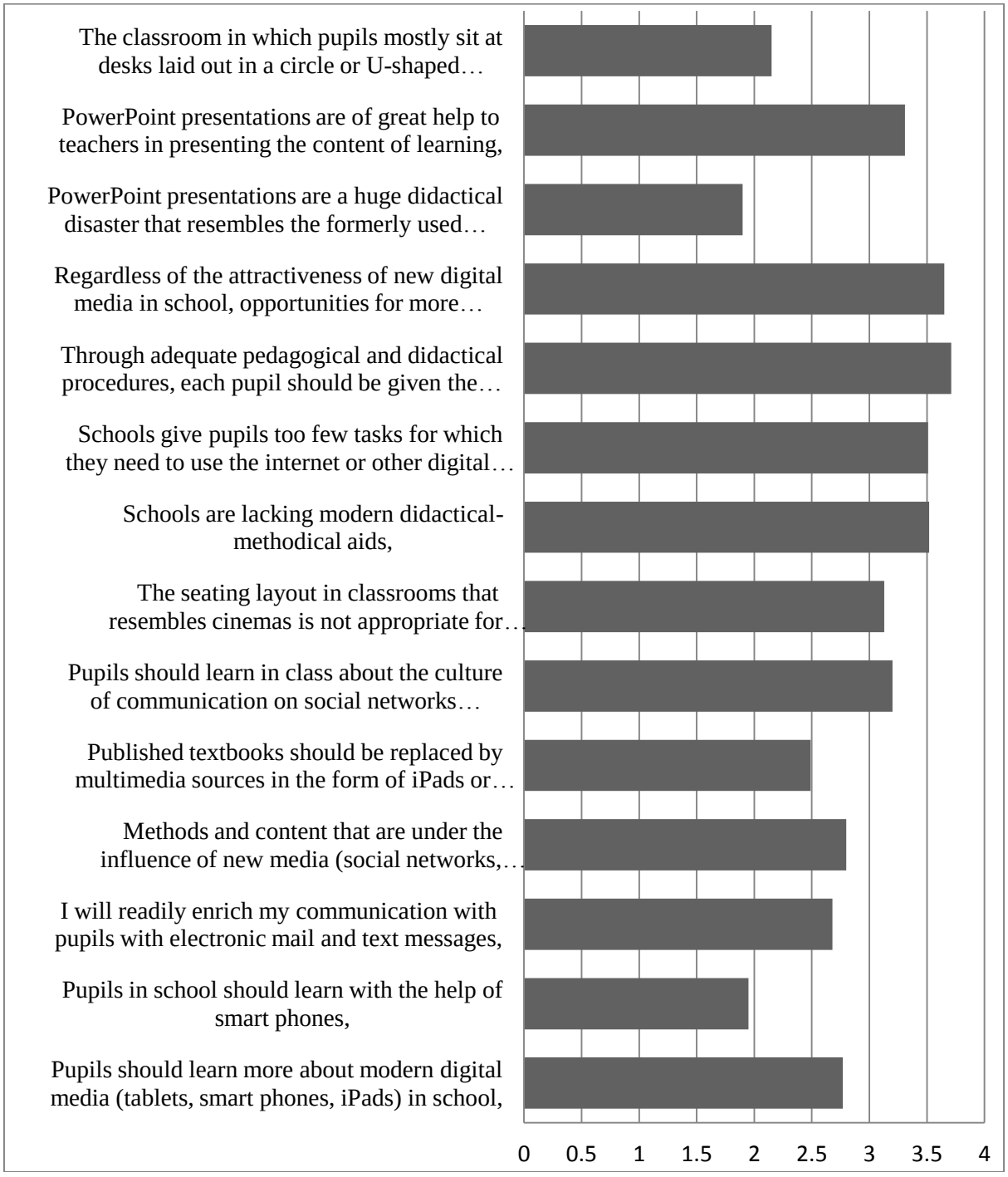


Chart 1.Arithmetic mean of manifest statements

In Chart 1, it is clear that, along with the statements mentioned and emphasised above, teachers give a significantly positive assessment to the statement, i.e., they point out that: *"Pupils should learn in class about the culture of communication on social networks (Facebook, Twitter...),"* *"The seating layout in classrooms that resembles cinemas is not appropriate for achieving the goals of education in school today,"* *"Published textbooks should be replaced by multimedia sources in the form of iPads or tablet computers with a large amount of audio-visual and multimedia content accompanying the text,"* and *"I will readily enrich my communication with pupils with electronic mail and text messages"*.

Further, the results show that, in general, teachers believe that curricular changes are needed, that in primary education the 'pedagogy of success for all' is still missing, and they are mostly satisfied with the existing educational environment (which in most cases is still not fully pupil-centred). Detailed analyses of the differences in view of particular characteristics of teachers show mostly similar results.

The Mann-Whitney test showed that there are no statistically significant differences in any dimension in terms of gender. Regardless of the gender, teachers point out that it is necessary to implement curricular changes, that there is not enough 'pedagogy of success for all' in schools, although to a somewhat lesser extent they criticise the existing educational environment (Table 3).

Table 3.Differences in terms of the teachers' gender

| Changes | Gender | *N* | *M* | *SD* | *Mdn* | *Z* | *U* | *p* |
|---|---|---|---|---|---|---|---|---|
| Curricular changes required | male | 7 | 2.79 | .75 | 2.85 | -.611 | 623.5 | .542 |
| | female | 206 | 2.71 | .55 | 2.85 | | | |
| A critique of the educational environment | male | 7 | 2.28 | .45 | 2.33 | -1.928 | 417.0 | .054 |
| | female | 206 | 1.9 | .56 | 1.66 | | | |
| Pedagogy of success for all | male | 7 | 3.57 | 3.5 | .31 | -.554 | 635.0 | .58 |
| | female | 206 | 3.59 | .46 | 3.75 | | | |

It was demonstrated that teachers, regardless of gender, assess that the need to acknowledge 'pedagogy for all' is highly positive and significant for optimal classes. Statements from this factor are evaluated as significantly the highest in comparison with the other two factors. To a lesser extent, teachers hold that today certain curricular changes are needed in classes, while they are somewhat less critical of the level of equipment in the educational environment, i.e., it could be interpreted that they are to a certain extent aware of a lack of material equipment in schools, so they work with what they have at hand (Chart 2).

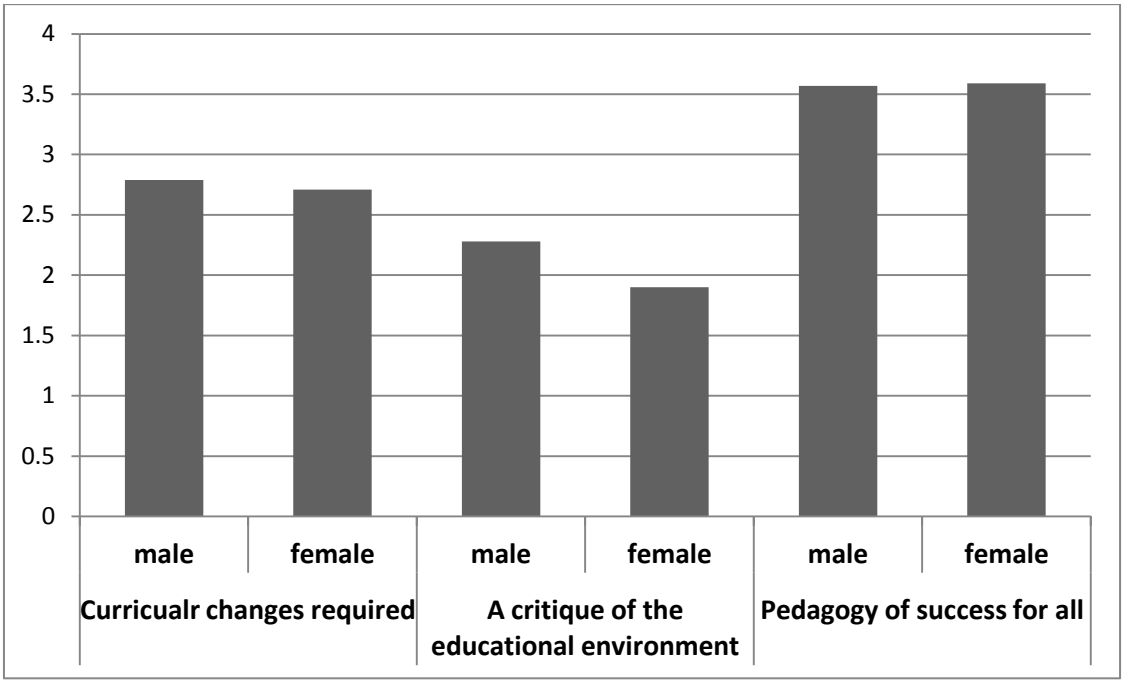


Chart 2.Arithmetic means in terms of the teachers' gender

The Kruskal Wallis H test shows that there is no statistically significant difference in the assessments of the need for changes in relation to years of service. In other words, regardless of the years of service, teachers hold that curricular changes are necessary, that there is not enough 'pedagogy for all' in school, although they criticise the existing educational environment to a lesser extent (Table 4).

Table 4.Differences in terms of the teachers' years of service

| Changes | Years of Service | *N* | *M* | *SD* | *Mdn* | *χ2* | *df* | *p* |
|---|---|---|---|---|---|---|---|---|
| Curricular changes required | to 10 | 41 | 2.59 | .57 | 2.71 | 4.27 | 3 | .234 |
| | 11 – 20 | 53 | 2.77 | .54 | 2.85 | | | |
| | 21 – 30 | 92 | 2.74 | .53 | 2.85 | | | |
| | over 30 | 27 | 2.67 | .61 | 2.85 | | | |
| A critique of the educational environment | to 10 | 41 | 1.80 | .60 | 1.66 | 2.154 | 3 | .541 |
| | 11 – 20 | 53 | 1.83 | .52 | 2.00 | | | |
| | 21 – 30 | 92 | 1.95 | .55 | 1.66 | | | |
| | over 30 | 27 | 1.97 | .59 | 2.00 | | | |
| Pedagogy of success for all | to 10 | 41 | 3.54 | .53 | 3.75 | 1.546 | 3 | .672 |
| | 11 – 20 | 53 | 3.57 | .43 | 3.50 | | | |
| | 21 – 30 | 92 | 3.65 | .38 | 3.75 | | | |
| | over 30 | 27 | 3.53 | .57 | 3.75 | | | |

According to the results presented in Chart 3, it is evident that teachers—regardless of their years of service—evaluate the statements within the factor 'Pedagogy of Success for All' as the most positive ones, i.e., they regard them as key for classes. To a lesser extent, they believe that for optimal instruction, curricular changes are needed, while they assess that the furnishing and procurement of equipment in the educational environment are the least significant element for constructivist teaching (pupil-centred instruction) in comparison with the other two factors (Chart 3).

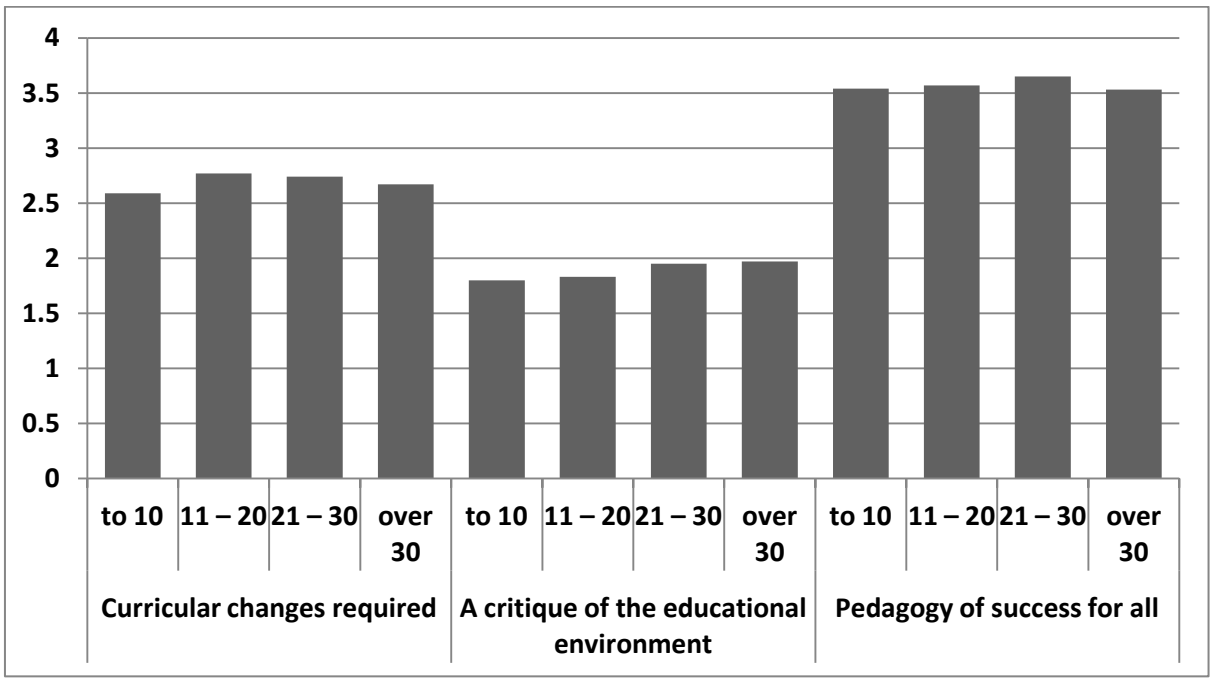

Chart 3.Arithmetic mean in terms of the frequency of teachers' professional development

In terms of differences relating to the frequency of professional development, the Kruskal Wallis H test showed that there are no statistically significant differences in assessments. In other words, regardless of the years of service, teachers hold that curricular changes are need, that there is not enough 'pedagogy of success for all' in schools, although they criticise the existing educational environment to a lesser extent (Table 5).

Table 5.Differences in terms of the frequency of professional development of teachers

| Changes | Development | *N* | *M* | *SD* | *Mdn* | *χ2* | *df* | *p* |
|---|---|---|---|---|---|---|---|---|
| Curricular changes required | never | 2 | 2.35 | .90 | 2.35 | 3.283 | 3 | .35 |
| | once | 16 | 2.58 | .46 | 2.85 | | | |
| | two times | 37 | 2.62 | .57 | 2.85 | | | |
| | three and more times | 158 | 2.75 | .55 | 2.85 | | | |
| A critique of the educational environment | never | 2 | 1.0 | .00 | 1.0 | 6.508 | 3 | .089 |
| | once | 16 | 2.14 | .72 | 2.0 | | | |
| | two times | 37 | 1.89 | .49 | 1.66 | | | |
| | three and more times | 158 | 1.90 | .54 | 1.83 | | | |
| Pedagogy of success for all | never | 2 | 3.62 | .53 | 3.62 | 5.556 | 3 | .135 |
| | once | 16 | 3.28 | .78 | 3.5 | | | |
| | two times | 37 | 3.58 | .35 | 3.5 | | | |
| | three and more times | 158 | 3.63 | .42 | 3.75 | | | |

In Chart 4, it is visible that teachers assess that statements within the factor *Pedagogy of Success for All* is the most positive one, i.e., regardless of the frequency of professional development, they assess that they are highly significant for pupil-centred instruction, that is, constructivist classes. On the other hand, they assess that curricular changes required are somewhat less significant, while they are least critical of the educational learning environment, especially those teachers who never attend professional development (Chart 4).

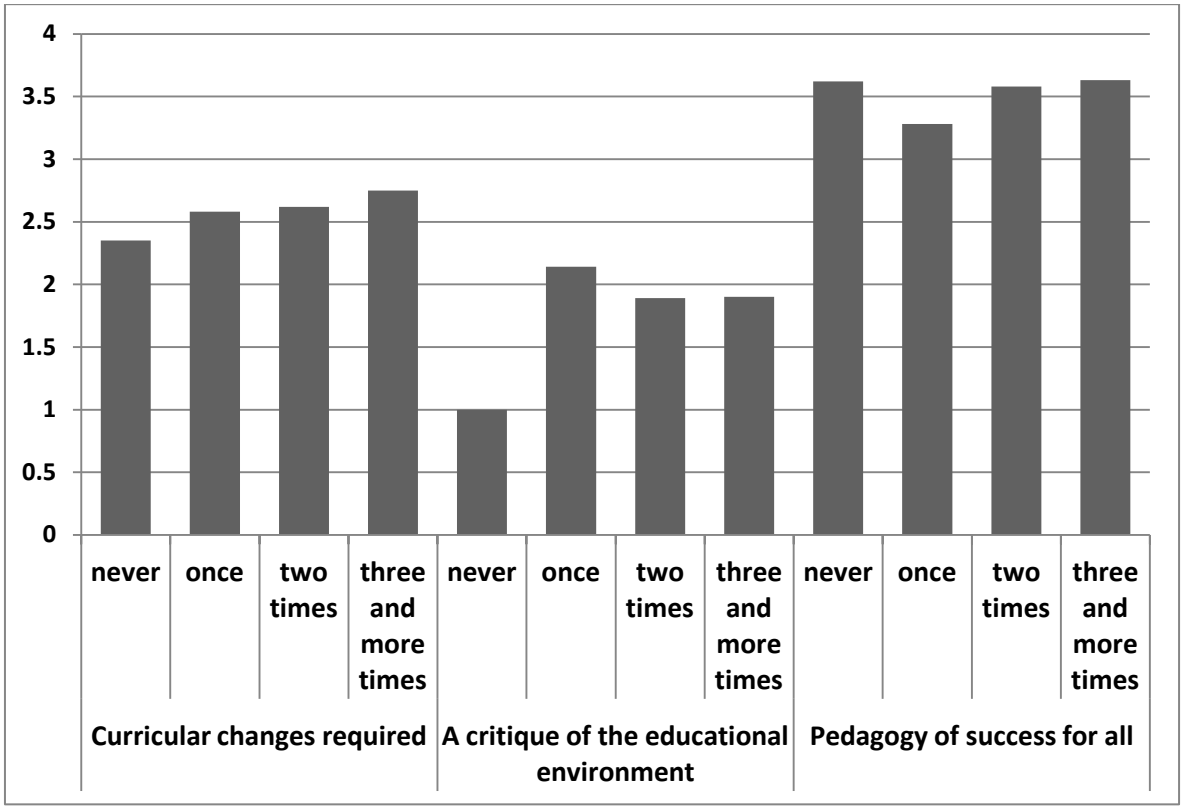


Chart 4. Arithmetic mean of the frequency of the professional development of teachers

Discussion

The fact that teachers, irrespective of their individual characteristics—such as gender, frequency of professional development and years of service—usually make an equal assessment of the individual characteristics of the current situation in classes and of the needs relating to changing them, can be interpreted in a way that such demographic characteristics are no longer significant for the differences between teachers.

What may prove just as significant is the frequency of professional training, which is evident from the fact that teachers who do not attend professional development are significantly less critical towards the level of equipment and organisation in the educational environment. Such results can be explained by stating that teachers who do not attend professional training are indifferent towards the criticism and defects of today's teacher-centred instruction. In other words, it does not matter to them how they organise their classes. Such results imply that today, at a time of continued and fast changes, as well as constant development, it is highly important to engage in continued professional development and lifelong learning.

The result showing that teachers express the greatest need for 'pedagogy of success for all', while they express an inclination towards essential curricular changes to a somewhat lesser extent, and that they are very non-critical towards defects in the educational environment, can be explained in such a way that, as professionals, teachers can have an impact on the 'pedagogy of success for all'. Namely, teachers as persons trained in the organisation of the activity of learning can introduce changes into their practice on their own, without any interventions, primarily in terms of the individualisation of classes by using new media. Such results are to a certain extent in line with previous research where similar results were obtained (Jones & Mclean, 2012).

Further, the fact that teachers assess that certain curricular changes are required, but to a somewhat lesser extent than 'pedagogy of success for all', can be explained by stating that teachers believe that they, as practitioners, can have a much less significant impact on such changes. In other words, one could interpret the results by stating that in Croatia changes and reforms organised "from above" or by the institutions within the state educational policy are still prevalent. In other words, this only confirms previous results that

for the implementation of novelties there must be the will, ability, material conditions and a strategy of implementation (Petko, 2012).
In addition, the result that shows that teachers are least critical towards the educational environment and the role of the multimedia environment for learning can be justified as an issue of the pedagogical standard of the school, where teachers probably believe that they have little impact on the level of equipment in the school. In this respect, teachers accept such a situation and work with what they have to hand. The foregoing also confirms the results obtained by Petko (2012) that show that, in addition to personal standpoints and the will and skills in using digital technology, whether or not the school has such technology is crucial for successful implementation.
A detailed analysis of the individual statements in the questionnaire shows that teachers hold the new media to be significant for modern instruction, but that the relationship between the pupil and the teacher is also important, and so is the pupil-centred teaching strategy, i.e., didactical arrangements for learning centred on the pupil, such as research- and problem-based learning, collaborative learning, play learning and action-based learning. On the other hand, this research again confirms that teachers use digital technology for organising teacher-centred instruction, as confirmed by their positive assessments that PowerPoint presentations are extremely useful in classes, where PowerPoint presentations are most frequently used in frontal instruction, which is in line with the results of research performed by Savaşci Açikalin (2014). This could be interpreted in a way that teachers lack professional training on how to implement digital technology in pupil-centred classes.

## Conclusion

The conclusion of this research is that Croatian schools, despite individual examples of good practice, are not dominated by constructivist teaching supported by the new media (pupil-centred instruction). Further, teachers hold that they can influence the organisation of pupil-centred instruction (the 'pedagogy of success for all'), but that there must be a will to do so, as well as a sufficiently well-equipped educational environment. Further, teachers believe that it is necessary to organise student-centred classes (constructivist classes), but the question remains about to what extent this actually happens.
Further, the use and implementation of digital technology in teacher-centred classes is still dominant, since teachers hold that smart phones do not add a greater resource to instruction, while on the other hand they find PowerPoint presentations extremely useful, although the reach of PowerPoint presentations is mostly within the limited framework of frontal instruction where pupils sit, keep silent and copy, just as they did thirty, fifty or more years ago.
On the other hand, teachers believe that significant curricular changes are not necessary. In other words, they hold that the factors in question are not relevant for optimal instruction. This could be explained by stating that teachers hold that they cannot have any effect on them personally, because the said factors are within the competence of the authorities responsible for education. In other words, irrespective of the curricular guidelines, teachers will still work to meet them. Further, it can be stated that the professional training of teachers in how to organise constructivist instruction and instruction with the new media is essential in such classes.
On the basis of the results of the research, it is recommended that professional training be organised for teachers in terms of how to organise constructivist instruction that includes the use of new media. Further, it is essential to prepare future teachers for media and constructivist didactics in the course of teacher studies.

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## UČITELJSKE PROCJENE ELEMENATA MULTIMEDIJSKE I KONSTRUKTIVISTIČKE DIDAKTIKE U ŠKOLI

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Sažetak

I pored spoznaja koje godinama nude konstruktivistička i multimedijska didaktika te kurikulumska teorija i teorija višestrukih inteligencija u učionicama i nastavnom procesu se događa didaktika nastave usmjerene na učitelja. U učionicama prevladavaju didaktički i metodički scenariji koji su primjereniji nekom prošlom vremenu negoli pripadnicima net generacija učenika. Cilj istraživanja je bio ispitivanje procjena promjena koje se u školi i nastavi događaju (ili koje bi se mogle događati) pod utjecajem novih didaktičkih spoznaja i digitalne obrazovne tehnologije. Posebno konstruiranim upitnikom ispitan je uzorak učiteljica i učitelja primarnog obrazovanja (N = 213) koji je reprezentativan za središnju Hrvatsku jer su podaci prikupljani individualnim anketiranjem u školama koje se nalaze na području grada Zagreba i osam županija. Prikupljanje podataka su obavili studenti četvrte godine učiteljskog studija iz Zagreba, Petrinje i Čakovca na početku 2015. godine. Upitnik se sastojao od 25 tvrdnji koje su ispitanici procjenjivali na skali Likertova tipa. Rezultati su pokazali da učitelji procjenjuju da su potrebne kurikulumske promjene, da u razrednoj nastavi još uvijek nedostaje pedagogije uspjeha za sve, iako manje kritiziraju trenutnu (neprikladnu) obrazovnu sredinu.

***Ključne riječi***: multimedijska didaktika, konstruktivistička didaktika, učitelji primarnog obrazovanja, nastava u primarnom obrazovanju